



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,180	10/15/2003	Lionell K. Griffith	LA-7171-109US	7586

7590 02/21/2007
Robert Berliner
BERLINER & ASSOCIATES
31st Floor
555 W. Fifth Street
Los Angeles, CA 90013

EXAMINER

KAO, CHIH CHENG G

ART UNIT	PAPER NUMBER
----------	--------------

2882

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.		Applicant(s)	
	10/687,180		GRIFFITH, LIONELL K.	
	Examiner		Art Unit	
	Chih-Cheng Glen Kao		2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2006 and 03 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21-28 and 35-42 is/are allowed.
- 6) ☒ Claim(s) 1-20 and 29-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 1, 2006, has been entered.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 1-14 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claims are directed to a judicial exception. As such, pursuant to the Interim Guidelines on Patent Eligible Subject Matter (see the OG Notice dated November 22, 2005, and MPEP 2106), the claims must have either physical transformation and/or a useful, concrete, and tangible result.

3. Regarding claims 1-6, the claims fail to include transformation from one physical state to another. Although the claims appear useful and concrete, there does not appear to be a tangible result claimed. Merely obtaining a 3D volumetric image of an object is not sufficient to

Art Unit: 2882

constitute a tangible result, since the outcome of the obtaining step has not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. As such, the subject matter of the claims is not patent eligible.

4. Regarding claims 7-14, the claims fail to include transformation from one physical state to another. Although the claims appear useful and concrete, there does not appear to be a tangible result claimed. Merely comparing a location of the first shadow image and a location of the second shadow image to determine the source and object angles relative to the energy sensor is not sufficient to constitute a tangible result, since the outcome of the comparing step has not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. As such, the subject matter of the claims is not patent eligible.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 5, 15-17, 19, 29-31, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swift (US 4472822) in view of Badea et al. ("A 3D Imaging System for

Art Unit: 2882

Dental Imaging Based on Digital Tomosynthesis and Cone Beam CT”) and Ruimi (US 6324246).

6. Regarding claims 1, 15, and 29, Swift discloses a method, system, and apparatus (title) for obtaining an image of an object (fig. 3, “object”) in which a ray of energy from a source (fig. 5, “x-ray source”) travels through the object to directly impinge on an energy sensor (fig. 5, “detector”) defining an image plane and in which the object is rotated about an axis (fig. 5, “axis of rotation”) whereby an image is acquired by the energy sensor at successive rotational positions of the object (abstract), in which the object (figs. 3 and 5, “object”), but not the energy source (fig. 5, “x-ray source”), is rotated about an axis of rotation (fig. 5, “axis of rotation”), the axis of rotation of the object being at a position with respect to the image plane (fig. 5, “detector”).

However, Swift fails to disclose digital tomosynthesis, obtaining a 3D volumetric image, and an axis being at a canted angle with respect to an image plane.

Badea et al. teaches digital tomosynthesis (abstract and the second paragraph of the introduction). Ruimi teaches obtaining a 3D volumetric image (col. 7, lines 54-56) and an axis (fig. 1, axis long the Z’ axis) being at a canted angle with respect to an image plane (col. 1, lines 45-58).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the method, system, and apparatus of Swift with the digital tomosynthesis of Badea et al., since one would have been motivated to make such a modification for radiation protection (abstract) as shown by Badea et al.

Art Unit: 2882

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the method, system, and apparatus of Swift with the 3D volumetric imaging and canted angle of Ruimi, since one would have been motivated to make such a modification for better resolving image features via different angles (col. 1, lines 45-58) as implied from Ruimi.

7. Regarding claims 2, 3, 16, 17, 30, and 31, Swift further discloses in which the energy is in the form of electromagnetic radiation, and in which the electromagnetic radiation is x-ray radiation (title).

8. Regarding claims 5, 19, and 33, Swift further discloses in which an optical axis of the source (figs. 3 and 5, #11) is perpendicular to the image plane (figs. 3 and 5, #18).

9. Claims 4, 18, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swift, Badea et al., and Ruimi as applied to claims 1, 15, and 29 above, and further in view of Hsieh (US 6226350).

Swift as modified above suggests a method, system, and apparatus as recited above.

However, Swift fails to disclose in which an energy sensor is a flat panel digital detector.

Hsieh teaches in which an energy sensor is a flat panel digital detector (col. 2, lines 27-31).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further modify the method, system, and apparatus of Swift as modified

Art Unit: 2882

above with the detector of Hsieh, since one would have been motivated to make such a modification for obtaining projection data faster (col. 2, lines 27-31) as implied from Hsieh.

10. Claims 6, 20, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swift, Badea et al., and Ruimi as applied to claims 1, 15, and 29 above, and further in view of Yanof et al. (US 5371778).

Swift as modified above suggests a method, system, and apparatus as recited above.

However, Swift fails to disclose in which a ray of energy from a source is mathematically traced through a voxel of an object space to an image plane, a coordinate of a shadow of the voxel on the image plane is computed for each object rotation, and image data is extracted and combined to form the object space voxel.

Yanof et al. necessarily teaches in which a ray of energy from a source is mathematically traced through a voxel of an object space to an image plane, a coordinate of a shadow of the voxel on the image plane is computed for each object rotation, and image data is extracted and combined to form the object space voxel (figs. 4 and 5; and col. 7, line 29 – col. 8, line 5).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further modify the method, system, and apparatus of Swift as modified above with the tracing, computing, extracting, and combining of Yanof et al., since one would have been motivated to make such a modification for faster processing (col. 2, lines 11-36) as implied from Yanof et al.

Allowable Subject Matter

11. Claims 21-28 and 35-42 are allowed. The following is a statement of reasons for the indication of allowable subject matter.

Regarding claims 21 and 35, prior art fails to disclose or fairly suggest a digitized tomosynthesis system or apparatus, including at least one mechanism for determining an axis of rotation of an object, and one or more computer programs being capable of comparing a location of a first shadow image and a location of a second shadow image to determine source and object angles relative to an energy sensor, in combination with all the limitations in each respective claim. Claims 22-28 and 36-42 are allowed by virtue of their dependency.

Response to Arguments

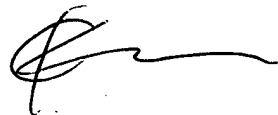
12. Applicant's arguments with respect to claims 1-20 and 29-34 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Chih-Cheng Glen Kao
Examiner
Art Unit 2882